ANALYTICAL APPROXIMATIONS

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Analytical Approximation

Chi-Square Integral: To better than .0012 over

$0 \leq x \leq 8$ for $m = 8$,

$$F_m(x) = \frac{1}{2\Gamma\left(\frac{m}{2}\right)} \int_0^x \left(\frac{t}{2}\right)^{\frac{m}{2} - 1} e^{-\frac{t}{2}} dt$$

$$\doteq .0020785x^4 - .00059482x^5$$

$$+ .000063672x^6 - .0000024544x^7.$$

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Analytical Approximation

Chi-Square Integral: To better than .0009 over $0 \leq x \leq 7$ for $m = 7$,

$$F_m(x) = \frac{1}{2\Gamma\left(\frac{m}{2}\right)} \int_0^x \left(\frac{t}{2}\right)^{\frac{m}{2}-1} e^{-\frac{t}{2}} dt$$

$$\doteq .0066063x^{7/2} - .0019840x^{9/2}$$
$$+ .00023041x^{11/2} - .0000098514x^{13/2}.$$

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Analytical Approximation

Chi-Square Integral: To better than .00055 over

$0 \leq x \leq 6$ for $m = 6$,

$$F_m(x) = \frac{1}{2\Gamma\left(\frac{m}{2}\right)} \int_0^x \left(\frac{t}{2}\right)^{\frac{m}{2} - 1} e^{-\frac{t}{2}} dt$$

$$\doteq .019283x^3 - .0060071x^4 + .00075727x^5 - .000036258x^6.$$

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Analytical Approximation

Chi-Square Integral: To better than .00035 over $0 \leq x \leq 5$ for $m = 5$,

$$F_m(x) = \frac{1}{2\Gamma\left(\frac{m}{2}\right)} \int_0^x \left(\frac{t}{2}\right)^{\frac{m}{2}-1} e^{-\frac{t}{2}} dt$$

$$\doteq .051288x^{5/2} - .016244x^{7/2} + .0022143x^{9/2} - .00011981x^{11/2}.$$

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Analytical Approximation

Chi-Square Integral: To better than .00016 over $0 \leq x \leq 4$ for $m = 4$,

$$F_m(x) = \frac{1}{2\Gamma\left(\frac{m}{2}\right)} \int_0^x \left(\frac{t}{2}\right)^{\frac{m}{2} - 1} e^{-\frac{t}{2}} dt$$

$$\doteq .12333x^2 - .038469x^3 + .0056190x^4 - .00034739x^5.$$

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